Preventive Health Behaviors, Health-Risk Behaviors, Physical Morbidity, and Health-Related Role Functioning Impairment in Veterans with Post-Traumatic Stress Disorder

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An examination of the relationships between health behaviors (preventive and risk-related), physician-diagnosed medical problems, role-functioning impairment because of physical morbidity, and post-traumatic stress disorder was conducted on a large cohort of consecutive treatment-seeking cases (N = 826) presenting to an outpatient Veterans Affairs post-traumatic stress disorder clinic. Results revealed that the sample rates of several medical conditions were markedly elevated when compared with general population rates for men of a comparable age. The rates of smoking and other behavioral risk variables were greater than rates among men in the general population. Moreover, the majority of the sample did not engage in preventive health behaviors such as exercise and medical screening at levels consistent with health care guidelines. Physical role functioning indices of the SF-36 reveal greater role-functioning impairment because of physical morbidity in this psychiatric sample relative to the age adjusted general population norms. The health care implications of these data are discussed, as are areas for future research.

Introduction

Post-traumatic stress disorder (PTSD) is among the most prevalent of psychiatric disorders according to recent epidemiological data.[1] In addition, evidence suggests that PTSD is among the costliest psychiatric disorders in terms of economic burden on the health care system.[2] It has been determined that, in large measure, this latter finding is driven by a higher than expected use of health care systems for physical morbidity among individuals with PTSD relative to the general population and other psychiatric groups.[3] Such findings underscore the need for research to identify the reasons behind the correlation between PTSD, physical morbidity, and health care use.

In recent years, several empirical papers have emerged suggesting that chronic PTSD is associated with poor physical health. For example, individuals with PTSD report a greater number of specific symptoms (back pain) and diagnostic conditions (hypertension) relative to groups without PTSD.[4] In addition, physician-diagnosed medical problems are more frequent among those who carry a diagnosis of chronic PTSD relative to those who do not.[5] Regarding biological indicators or correlates of health, chronic PTSD has been associated with elevated resting heart rate,[6] incidence of nonfatal myocardial infarction,[7] low heart rate variability,[8] elevated basal catecholamine levels,[9] and abnormal hypothalamic-pituitary-adrenal functioning.[10] Such effects have been demonstrated across a variety of independent laboratories, and many of these biological measures are statistical risk factors for premature death. Finally, research suggests that relative to nonpsychiatric controls and other psychiatric groups, PTSD is associated with elevated rates of role-functioning impairment because of physical morbidity.[11]

These areas of investigation point in unison to the fact that having a diagnosis of chronic PTSD is a risk factor for physical morbidity and that the effect does not seem constrained to one organ system.[12] Recent studies have begun searching for causal mechanisms that might account for such effects. Some researchers have hypothesized that repeated responding to stressors with augmented and sustained sympathetic nervous system output places individuals with PTSD at undue risk for physical morbidity.[6] Indeed, several laboratory studies suggest that individuals with PTSD show augmented sympathetic responses to stress challenges relative to control groups.[13] Such findings suggest that potentiated and sustained responding to stress in the sympathetic nervous system facilitates disease processes. Alternatively, some have proposed that the documented relationship between PTSD and certain adverse health behaviors (e.g., smoking) might provide a mediational link between PTSD and physical health. For example, PTSD is associated with high rates of alcohol abuse/dependence.[1] It is well documented that alcohol consumption of greater than three drinks per day is associated with increased blood pressure and heart rate, as well as increased mortality from coronary artery disease and stroke.[14] PTSD is also associated with markedly elevated rates of nicotine use relative to the general population.[15] These influences point to ways in which PTSD can have an indirect impact on cardiovascular health.

The noted studies notwithstanding, there are some deficits in the current literature regarding PTSD and health behaviors. Specifically, most studies in this area have had a singular focus (e.g., smoking) and/or have relied on self-reporting and relatively small sample sizes.[16] Moreover, most of these studies have focused on adverse health behaviors without examining the frequency of preventive lifestyle behaviors such as exercise. Thus, the relationship of PTSD to preventive health behaviors is unknown.

We are not aware of any studies that have examined multiple indices of health-risk behaviors, physician-diagnosed medical problems, preventive health behaviors, and role-functioning limitations associated with physical morbidity in the same sample of PTSD patients diagnosed via reliable structured interview (e.g., Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders [DSM-IV]).[17]

In this study, we provide descriptive data on a large (N = 826),

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consecutive, treatment-seeking cohort of veterans presenting to a PTSD Clinic at a Veteran's Affairs Medical Center. Several psychometrically sound instruments were used to gather indices of health behaviors and psychiatric problems. Specific aims include cataloguing the frequency of physician-diagnosed medical problems in this psychiatric population, conducting statistical comparisons of the rates of such diagnoses against expected rates for men of comparable age in the general population, cataloguing the frequency of preventive health behaviors in this psychiatric population and contrasting with health care recommendations for such behaviors, cataloguing the prevalence of adverse lifestyle behaviors that characterize this group of patients and contrast them with population normative data, and comparing rates of role-functioning impairment because of physical morbidity in this sample with population norms.

Method

Participants

Participants were 826 consecutive veterans who were self-referred or were referred by way of a medical provider for a comprehensive assessment at a Veterans Affairs (VA) PTSD clinic between 1996 and 2002. The data presented here are based on the results of an archival analysis of clinic data gathered in the context of clinical assessment. The local Institutional Review Board approved this study as being exempt from consent processes because the data had been stripped of identifying information that might be used to link information back to any specific veteran. Demographic information on the sample is presented in Table I.

TABLE I

SAMPLE DEMOGRAPHICS

Variable	Percent or Mean Value (SD)	
Age (years)	51.69	(9.93)
Race		
Caucasian/minority	81.9%/18.1%	
Marital status		
Never married	15.0%	
Married or live in	49.3%	
Divorced/separated	33.9%	
Widowed	1.8%	
Income		
$0–20,000	61.6%	
$20–40,000	24.5%	
$40,000 and above	13.9%	
Education		
Some high school	7.2%	
High school graduate	35.8%	
Some college	38.3%	
College graduate	13.7%	
Graduate school degree	5.0%	
Psychiatric status		
Primary diagnosis PTSD	83.7%	
Primary diagnosis other Axis I	11.7%	
No diagnosis	4.6%	
BMI	28.7	(5.45)

Procedure

The assessment process at this clinic is based on structured clinical interviews, self-reporting instruments, and a review of medical records and physician-diagnosed medical problems (which are available from hospital computer systems). Psychiatric assessments were completed by staff psychologists or supervised doctoral level interns completing their internship training in clinical psychology. The assessments included a broad array of structured interviews and self-reported measures. Because this was data collected in the context of service delivery, and not research, not all instruments are available on all 826 veterans. Thus, the sample size per each specific variable may vary as a function of its temporal addition to the clinical assessment procedure. Nearly all interview and self-reported data in this clinic are electronically scanned into databases from coding sheets, thereby reducing human data entry errors. A random check of the data suggests that less than 10% of the data were hand-entered (e.g., at times when electronic scanning equipment was in repair).

Measures

Clinician-Administered PTSD Scale[18]

This is a semistructured interview that assesses the 17 symptoms of PTSD as defined by DSM-IV.[19] It is commonly used as the "gold standard" diagnostic instrument for assessing PTSD as it has very good psychometric properties.

Structured Clinical Interview for DSM-IV[17]

This is a structured interview that assesses Axis I Psychopathology commensurate with diagnostic criteria outlined in the DSM-IV. This instrument was used to assess the presence/absence of psychopathology other than PTSD.

SF-36[20]

This 36-item self-reported instrument is a validated measure of role-functioning impairments in eight domains, four of which relate to mental health and four of which relate to physical health.

Alcohol Use Disorders Identification Test (AUDIT)

The AUDIT is a 10-item screening instrument developed by the World Health Organization that indicates the likelihood of alcohol use problems over the previous 12 months. Scores range from 0 to 40. A score of 8 or above has been found to accurately identify 92% of patients with alcoholism.[21]

Drug Abuse Screening Test (DAST)

The DAST is a 10-item screening instrument developed by the Addiction Research Foundation that indicates the degree of drug abuse-related problems over the previous 12 months.[22]

Health-Risk Appraisal (HRA)[23]

The HRA is a 59-item self-reported instrument that assesses family medical history and current health behavior practices. The HRA provides indices of exercise behavior, weekly alcohol intake, weekly tobacco intake, time since last medical screening for colorectal cancer, and for men, time since last screening for prostate cancer.

Data from the HRA regarding exercise frequency and intensity

was used as the basis for categorizing our patients' exercise levels. Exercise episodes were defined by the question that asked patients how often they "engage in physical activity which increases heart rate, causes you to breathe and/or sweat heavily and is done for at least 20 minutes duration." Patients were then rated in one of three categories of frequency of exercise: less than once per week, one to two times per week, and three or more times per week, with the last category being the threshold for adequate exercise. This categorization was used as the threshold because recent data from more than 50,000 individuals in the Health Professionals Follow-Up Study indicated that cardiovascular exercise of this type for 1 hour or more per week results in markedly reduced cardiovascular risk.[24]

The questions regarding time since last screening examination for prostate cancer (prostate-specific antigen [PSA] testing) and colorectal cancers (fecal occult blood test [FOBT]) were used as proxy measures for willingness to engage in preventive health care use. These two variables were chosen because VA practice guidelines are specific about the application of these two screening measures for veterans receiving care at VA hospitals. It is VA policy that all male veterans age 50 years and older receive an annual FOBT for screening for colorectal cancer and annual counseling regarding the potential benefits and hazards of PSA testing, and then the patient decides whether to pursue PSA screening. Given these recommendations, the time since last examination for these two cancer screening procedures can serve as a useful proxy measure for willingness to engage in preventive health care procedures in general. These procedures were analyzed separately given the unanimity in the medical community about the value of FOBT screening to detect colorectal cancer and the relatively contested nature of the clinical value of PSA testing at this time.[25] Analyses for these two screening variables were restricted to individuals 50 years of age or older.

Medical Information Form

This is a locally designed form that was used to track the presence of a broad range of self-reported symptoms (e.g., headaches, tinnitus, erectile dysfunction, etc.) and specific physician-diagnosed diseases (e.g., hypertension).

Body Mass Index (BMI)

For a subset of the veterans, height and weight were assessed on a physician's scale (Detecto, Carpinteria, CA), and BMI was computed by dividing weight in kilograms by height in meters squared.

Data Analyses

As our primary purpose was to provide a descriptive summary of health behaviors and health status among veterans with chronic PTSD, much of the data reported is by way of descriptive statistics. When appropriate, we compared our sample values against known population estimates or base rates of the variable in question with inferential statistics (base rates of specific diagnoses were gathered from epidemiological databases at the Centers for Disease Control and Prevention). In such instances, we used inferences about a single mean with the general population estimate as the reference point for statistical comparison. The t test and χ^2 statistics are reported for such analyses.

Results

Demographics

Demographic data are presented in Table I. As this is a consecutive case series of more than 800 patients, these demographics are representative of the clinical population that presents to this VA hospital. Worthy of note is the average age of our sample (52 years of age), the approximate age at which preventive health care procedures (e.g., colorectal cancer screening) become of greater importance.

Physician-Diagnosed Medical Problems

Table II shows the lifetime prevalence for specific physician-diagnosed diseases and expected lifetime rates of the same diagnostic conditions for American men of comparable age in the general population. Not all disease categories had available general population data for prevalence estimates. Chi-square analyses were completed with general population rates as the expected values to determine whether the rates of illness in this consecutive case series differed from what would be expected among men of comparable age without PTSD. Results indicate that rates of asthma, arthritis, tuberculosis, diabetes (I and II), stroke, cancer (of any type), nonfatal myocardial infarction, and cirrhosis of the liver are elevated in this population relative to age-comparable men in the general population. Statistical comparisons of these effects are reported in Table II.

BMI

The sample, on average, is overweight, with a mean BMI of 28.7. As BMIs below 25 are generally considered healthy,[26] we

TABLE II

PHYSICIAN-BASED DIAGNOSES

	Percentage with Lifetime Diagnosis (n = 600)		
Condition	Current Sample (Yes/No)	Population Rates (Based on Centers for Disease Control Data)	Statistical Comparison
Asthma	15.0/85.0	7.2% (general population)	$\chi^2 = 54.63$, $p < .001$
Tuberculosis	6.7/93.3	Not available	N/A
Arthritis	35.1/64.9	19.4% (males age 45–54)	$\chi^2 = 93.93$, $p < .001$
Diabetes (type I or II)	13.0/87.0	9.17% (males age 45–64)	$\chi^2 = 16.42$, $p < .001$
Essential hypertension	38.0/62.0	36.9% (males age 45–54)	$\chi^2 = .312$, $p < .577$
Stroke	5.7/94.3	2.2% (age-adjusted men over 20)	$\chi^2 = 33.51$, $p < .001$
Myocardial infarction	11.7/88.3	8% (coronary artery disease, males age 45–54)	$\chi^2 = 10.96$, $p < .001$
Cancer (of any type)	10.5/89.5	6% (males age 45–54)	$\chi^2 = 21.68$, $p < .001$
Cirrhosis of liver	23.0/77.0	8.66% (males age 45–54)	$\chi^2 = 156.56$, $p < .001$

used a BMI of 25 as the reference point for comparisons about a single mean. Statistical analysis revealed that this group of veterans is significantly overweight, with a mean BMI of 28.7 [$t(118) = 7.37$, $p < 0.05$].

Preventive Health Behaviors

With respect to exercise, only 42% of the sample reported exercising at least three times per week (defined by minimum of 20 minutes duration with elevated heart rate). Twenty-six percent report exercising only one to two times per week and 33% reported exercising less than once per week.

With respect to preventive prostate screening examination (PSA testing), nearly one-half of the veterans over the age of 50 reported that it had been greater than 1 year since their last examination (42%). In fact, 11% report never having the test. The figures for colorectal cancer screening were similar, with 39% reporting more than 1 year since their last FOBT and 10% reporting never having had such a screen.

Health-Risk Behaviors

Forty-five percent of this treatment-seeking sample reported being regular smokers. Compared with the population rate of roughly 22%,[15] this was a statistically significant elevation ($\chi^2 = 180.60$, $p < 0.01$). Of those who reported that they were smokers, 73% smoked one pack or greater per day. Among veterans who completed the AUDIT, 36.5% of the individuals reported usage patterns that would be defined as, at least, alcohol abuse in the preceding 12 months (AUDIT score of 8 or greater).[21] For the subsample of patients that completed the DAST, 16% reported drug abuse in the past 12 months (DAST score of 6 or greater).[27]

Role Functioning and SF-36

To examine the impact of the aforementioned health problems on role functioning, the four physical health subscales of the SF-36 were examined. Mean data are presented graphically in Figure 1 (against general population norms). The t test about a single mean was used to see whether the clinical sample scores were different from those of the general population. The group mean was significantly lower than population norms on the Physical Functioning Scale score, $t(387) = 19.65$, $p < 0.01$; the Role-Functioning Physical Scale score, $t(387) = 37.46$, $p < 0.01$; the Bodily Pain Scale score, $t(386) = 28.60$, $p < 0.01$; and the General Health Scale score, $t(388) = 30.16$, $p < 0.01$.

Discussion

Data from this report suggest that the average level of self-care and physical morbidity in treatment-seeking veteran PTSD samples is quite poor. This conclusion is based on the high rate of health-risk behaviors, the relatively low frequency of preventive health behaviors, the higher incidence of specific medical conditions, and the marked levels of role-functioning impairment because of physical morbidity relative to the general population. Although several studies exist that examine specific aspects of health behavior in conjunction with PTSD (e.g., smoking),[15] this is the first analysis to examine such a wide variety of health behaviors, causal and preventive, in conjunction with physical morbidity in the same clinical sample of patients presenting to a PTSD clinic.

Our findings on specific diagnostic conditions and self-reported health were concordant with what one would expect in a population that engages in poor self-care. Interestingly, an increased risk for nonfatal stroke and myocardial infarction was indicated, but only a small increase in risk for essential hypertension was found. These findings are generally consistent with a growing literature suggesting that PTSD is a risk factor for cardiovascular disease.[6,7] These investigators have suggested that the association between chronic PTSD and cardiovascular

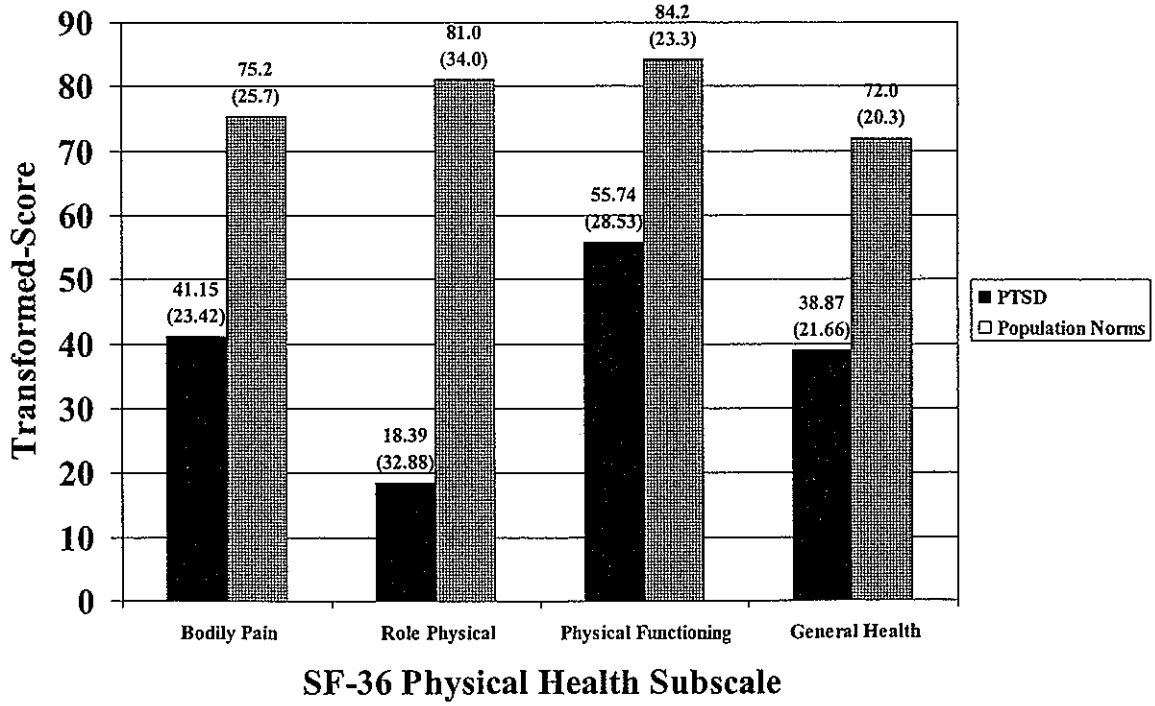

Fig. 1. SF-36 physical health subscale scores vs. general population means.

risk factors (resting heart rate)[6] and outcomes (myocardial infarction)[7] is mediated, at least in part, by a high comorbidity of PTSD with certain health behaviors. The elevated BMIs in this sample also suggest that these patients are at elevated risk for cardiovascular problems.

In addition to the diagnostic data, our findings also suggest that individuals with chronic PTSD engage in a variety of health behaviors that confer elevated risk for cardiovascular problems. They smoke at levels twice the rate in the general population (see Ref. 15), exercise less frequently than recommended for a reduction in cardiovascular risk (see Ref. 24), and engage in preventive health care visits on a less than regular basis. In addition, roughly one-third of the sample scored in the "abuse" range on a quantitative measure of alcohol abuse and more than 10% of the sample scored in the "abuse" range on a measure of drug abuse. Such a profile of lifestyle behaviors certainly confers an elevated risk for cardiovascular disease as well as risk in other organ systems.

In total, the results suggest that although these individuals were presenting to a PTSD specialty clinic and were seeking psychiatric treatment, assessment of physical morbidity and lifestyle behaviors is an issue that warranted great importance from a treatment-planning perspective. Educational and behavioral interventions aimed at health promotion (i.e., wellness groups) can play a role in the secondary prevention of physical morbidity in this high-risk psychiatric population. In fact, as a matter of clinical practice, we have instituted a wellness group in our local VA PTSD clinic as a way of trying to promote good self-care in addition to providing more traditional psychiatric and psychosocial treatments for DSM-IV categorical diagnoses related to trauma (i.e., PTSD and major depression). Future treatment outcome data will reveal the effectiveness of such strategies in terms of secondary prevention of physical morbidity. However, in the short term, the extant data argue strongly in favor of assessing physical health domains and providing appropriate education and intervention around the physical health issues most applicable to individuals with chronic PTSD. Such treatments should be delivered above and beyond traditional therapies that are solely aimed at reducing psychiatric symptoms in this population.

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